Executive **Summary**

EIS

Preliminary Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska

January 2005

United States Department of Commerce
National Oceanic and Atmospheric Administration

National Marine Fisheries Service
Alaska Region

EXECUTIVE SUMMARY

Introduction

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act included new provisions concerning the identification and conservation of Essential Fish Habitat (EFH). The Magnuson-Stevens Act defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The National Marine Fisheries Service (NMFS) and regional Fishery Management Councils (Councils) must describe and identify EFH in fishery management plans (FMPs), minimize to the extent practicable the adverse effects of fishing on EFH, and identify other actions to encourage the conservation and enhancement of EFH. Federal agencies that authorize, fund, or undertake actions that may adversely affect EFH must consult with NMFS, and NMFS must provide conservation recommendations to federal and state agencies regarding actions that would adversely affect EFH. Councils also have the authority to comment on federal or state agency actions that would adversely affect the habitat, including EFH, of managed species.

This environmental impact statement (EIS) evaluates alternatives for three actions: (1) describing EFH for fisheries managed by the North Pacific Fishery Management Council; (2) adopting an approach for the Council to identify Habitat Areas of Particular Concern (HAPCs) within EFH; and (3) minimizing to the extent practicable the adverse effects of Council-managed fishing on EFH. Table ES-1 provides an overview of the environmental consequences of each alternative in terms of the issues and criteria that were used in the evaluation.

Background

The Council amended its five FMPs (Bering Sea/Aleutian Islands [BSAI] Groundfish FMP, Gulf of Alaska [GOA] Groundfish FMP, BSAI Crab FMP, Scallop FMP, and Salmon FMP) in 1998 to address the new EFH requirements. The Secretary of Commerce, acting through NMFS, approved the Council's EFH FMP amendments in January 1999. In the spring of 1999, a coalition of seven environmental groups and two fishermen's associations filed suit in the United States District Court for the District of Columbia to challenge NMFS' approval of EFH FMP amendments prepared by the Gulf of Mexico, Caribbean, New England, North Pacific, and Pacific Fishery Management Councils (*American Oceans Campaign [AOC] et al. v. Daley et al.*, Civil Action No. 99-982-GK). The focus of the *AOC v. Daley* litigation was whether NMFS and the Council had adequately evaluated the effects of fishing on EFH and taken appropriate measures to mitigate adverse effects. In September 2000, the court upheld NMFS' approval of the EFH amendments under the Magnuson-Stevens Act, but ruled that the environmental assessments (EAs) prepared for the amendments violated the National Environmental Policy Act (NEPA). The court ordered NMFS to complete new and thorough NEPA analyses for each EFH amendment in question. This EIS is the curative NEPA analysis for the North Pacific Council's FMPs.

Most of the controversy surrounding the level of protection needed for EFH concerns the effects of fishing activities on sea floor habitats. Substantial differences of opinion exist as to the extent and significance of habitat alteration caused by bottom trawling and other fishing activities. This EIS reexamines the effects of fishing on EFH, presents a wider range of alternatives, and provides a more thorough analysis of potential impacts than the EA approved in 1999. Because the court did not limit its criticism of the 1999 EA solely to the section that considered the effects of fishing on EFH, this EIS also reexamines options for identifying EFH and HAPCs.

The Council used an extensive public process to develop the alternatives for this EIS, including numerous public meetings of the Council and its EFH Committee. In October 2003, the Council

reviewed a preliminary draft of the EIS and selected preliminary preferred alternatives for each of the three actions in the EIS. In January 2004, NMFS released the draft EIS for public comment. This final EIS includes revisions in response to public comments, incorporates some new analysis, and reflects the final preferred alternatives [TO BE ADDED AFTER FINAL COUNCIL ACTION].

The actions the Council and NMFS are taking in association with this EIS will result in new FMP amendments to modify the existing EFH and HAPC designations and to implement additional measures to reduce the effects of fishing on EFH. The new amendments will be Amendment 78 to the FMP for the Groundfish Fishery of the BSAI Area, Amendment 73 to the FMP for Groundfish of the GOA, Amendment 16 to the FMP for BSAI King and Tanner Crabs, Amendment 8 to the FMP for the Scallop Fishery off Alaska, and Amendment 7 to the FMP for the Salmon Fisheries in the Exclusive Economic Zone (EEZ) off the Coast of Alaska.

Relationship of the Three Actions Considered in this EIS

The three actions considered in this EIS are related, but are largely independent. Identification and description of EFH establish the boundaries within which the Council may identify HAPCs and within which the Council must minimize to the extent practicable the adverse effects of fishing. Thus, the Council only may adopt an approach for HAPC identification that would result in specific HAPCs falling within the boundaries of areas it identifies as EFH. Likewise, the Council is required to minimize adverse effects of fishing on habitats only within the boundaries of areas it identifies as EFH. The Council may act to minimize the adverse effects of fishing on other habitats, but is not required to do so.

All of the management areas in federal waters identified in the alternatives for minimizing the effects of fishing on EFH are located within the boundaries of the areas included in Alternatives 2 through 6 for describing and identifying EFH. Alternative 1 for describing and identifying EFH is the no action alternative, so EFH would not be described, and the requirement to minimize effects of fishing on EFH would not apply. Alternative 6 for describing and identifying EFH would result in no EFH designations in state waters (generally from the shore to 3 miles offshore), so the inshore management components of Alternatives 4, 5A, 5B, and 6 would not fall within the boundaries of EFH.

Action 1: Describe and Identify EFH

Alternatives

Alternative 1 (No EFH Descriptions): Under Alternative 1, EFH would not be described and identified for species managed by the Council. The existing EFH descriptions that were approved in 1999 would be rescinded.

Alternative 2 (Status Quo EFH Descriptions): Under Alternative 2, EFH descriptions would remain exactly as they were approved in the Council's EFH FMP Amendments in 1999. EFH would continue to be described as all habitats within a general distribution for a life stage of a species, for all information levels, and under all stock conditions. EFH would be a subset of the geographic range of each life stage, and it would encompass an area containing approximately 95 percent of the population.

Alternative 3 (Revised General Distribution – Preliminary Preferred Alternative): Under Alternative 3, EFH descriptions would be revised using the same basic methodology as Alternative 2, but applying the modified regulatory guidance from the EFH final rule (67 FR 2343, January 17, 2002; codified at 50 CFR 600 Subpart J) and incorporating recent and additional scientific information and improved mapping. In

some cases, the geographic extent of individual EFH descriptions would be narrower than under status quo Alternative 2.

Alternative 4 (Presumed Known Concentration): Under Alternative 4, EFH descriptions would be revised using a narrower interpretation of the best available scientific information for those species and life stages for which sufficient information exists to identify possible areas of higher habitat function. In many cases, the geographic extent of individual EFH descriptions would be reduced compared to Alternatives 2 and 3.

Alternative 5 (Ecoregion Strategy): Under Alternative 5, EFH would be described in eight ecoregions (freshwater, nearshore and estuarine, inner and middle shelf, outer shelf, upper slope, middle slope, lower slope, and basin) by characterizing the species that use each area and the habitat types present. The overall approach would be to identify distinct ecological areas, along with the species that rely upon those habitats.

Alternative 6 (EEZ Only): Under Alternative 6, EFH descriptions would be revised using the updated general distribution information from Alternative 3, but EFH would be limited to waters and substrate within the EEZ. No EFH would be described in freshwater areas, estuaries, or nearshore marine waters under the jurisdiction of the State of Alaska. In other words, Alternative 6 is the same as the EEZ portion of Alternative 3.

Environmental Consequences

Each of the alternatives for describing EFH uses different methodologies and results in different areas being identified as EFH for managed species. Describing and identifying EFH would not, in and of itself, have any direct environmental or economic impacts, but could lead to indirect impacts because EFH designation would trigger Magnuson-Stevens Act requirements to minimize adverse effects of fishing on EFH and to consider the effects of non-fishing actions on EFH. This EIS discusses the effects of each alternative on habitat, target species, the economic and socioeconomic aspects of federally managed fisheries, other fisheries and fishery resources, protected species, ecosystems and biodiversity, and non-fishing activities. Using a qualitative analysis, the EIS characterizes effects on each issue as negative, neutral, positive, or unknown (Table ES-2) and provides a narrative explanation of the anticipated effects. Differences in the environmental consequences of the alternatives are directly related to the areas and habitats encompassed by the resulting EFH descriptions. Different size designations could increase or decrease the efficacy of EFH conservation measures and the effects on other components of the environment.

In summary, Alternative 1 would eliminate EFH descriptions in Alaska, resulting in the loss of potential benefits of EFH protective measures for habitat, target species, and federally managed fisheries, as well as potential ancillary benefits for other fisheries and fishery resources, protected species, and ecosystems. Alternative 1 may have benefits for non-fishing activities because EFH consultations would no longer be required, eliminating an existing procedural step in the review of many proposed actions. Similarly, Alternative 1 could benefit the fishing industry in the short term because it would remove the need to consider new regulations to reduce the effects of fishing on habitat, although potential benefits (from conserving habitats that produce fish the industry harvests) would be lost. Alternative 2 would retain the status quo EFH descriptions and associated effects. The status quo effects would include the costs and benefits of having important fish habitats identified to encourage efforts to minimize adverse effects from fishing and non-fishing activities. Alternative 3 (preliminary preferred alternative) would refine the existing EFH description and identification, but would not lead to substantial changes in environmental effects because the areas identified would not be substantially reduced in size. To the extent that EFH

descriptions for some species would be reduced in geographic scope to reflect essential habitats more precisely, potential benefits for target species might increase slightly because conservation efforts could focus on those more discrete areas to avoid habitat loss or degradation. Alternative 4 would incorporate a narrower interpretation of the best available science, resulting in reduced EFH areas described for many species. As with Alternative 3, to the extent that EFH descriptions for some species would be reduced in geographic scope under Alternative 4, potential benefits for target species might increase because smaller EFH designations would enable managers to focus conservation efforts more effectively. Alternative 5 would use an ecoregion approach, resulting in larger EFH areas and perhaps a greater potential for indirect benefits for resources such as protected species. However, this approach may be less beneficial for target species and federally managed fisheries because it would be harder to distinguish EFH from all potential habitats. Alternative 6 would refine the existing EFH descriptions in the EEZ as in Alternative 3, but would eliminate the EFH descriptions in state waters, as in Alternative 1. Table ES-2 summarizes the effects of the EFH description alternatives for each issue evaluated in the EIS. However, the effects ratings alone do not provide a basis for distinguishing among some of the alternatives.

Table ES-3 compares the alternatives in terms of three summary factors: (1) the relative size of EFH areas, (2) consistency with the Magnuson-Stevens Act and the EFH regulations, and (3) overall efficacy and relative merits. Alternatives 1 and 6 are not consistent with the Magnuson-Stevens Act or the EFH regulations because they would not describe and identify those habitats necessary to managed species for spawning, breeding, feeding, and growth to maturity. Alternative 2 is not consistent with the Magnuson-Stevens Act or the EFH regulations because it does not reflect the best (most recent) scientific information available. Alternatives 3 through 5 are consistent with the Magnuson-Stevens Act and the EFH regulations. Those alternatives contain different approaches that influence their overall efficacy. Alternative 3 is very similar to Alternative 2, but applies more recent information, new analytical tools, and better mapping, resulting in geographically smaller EFH areas for some species. Any actions to conserve EFH could focus on these smaller areas. Alternative 4 is similar to Alternatives 2 and 3, but uses a narrower interpretation of the available scientific information, resulting in smaller EFH areas for many species. Alternative 4 may offer advantages for the conservation of EFH because it focuses EFH descriptions for most species on smaller areas than Alternative 3, allowing the Council, NMFS, other agencies, and the public to concentrate research and management efforts accordingly, but it may exclude some important habitats. Alternative 5 has effects that are similar to Alternatives 2, 3, and 4, but uses a very different approach that results in broader EFH descriptions, making it harder to distinguish EFH from all available habitats.

Action 2: Adopt an Approach for Identifying HAPCs

Alternatives

Alternative 1 (No HAPC Identification): Under Alternative 1, HAPCs would not be identified for species managed by the Council. The existing HAPC identifications that were approved in 1999 would be rescinded.

Alternative 2 (Status Quo HAPC Identification): Under Alternative 2, the existing HAPCs would remain in effect with no changes. Those HAPCs include living substrates in deep water, living substrates in shallow water, and freshwater areas used by anadromous salmon.

Alternative 3 (Site Based Concept – Preliminary Preferred Alternative): Under Alternative 3, the existing HAPC identifications would be rescinded and the Council would adopt an approach that would allow specific sites within EFH, selected to address a particular problem, to be identified as HAPCs in the future.

Alternative 4 (Type/Site Based Concept): Under Alternative 4, the existing HAPC identifications would be rescinded and the Council would adopt an approach that would allow specific sites selected within identified habitat types within EFH to be identified as HAPCs in the future.

Alternative 5 (Species Core Area): Under Alternative 5, the existing HAPC identifications would be rescinded and the Council would adopt an approach that would allow areas within EFH to be identified as HAPCs in the future, based on productivity of the habitat for individual species.

Environmental Consequences

The EFH regulations encourage Councils to identify HAPCs within EFH based on four considerations: ecological importance, sensitivity to environmental degradation, susceptibility to stress from development, and/or rarity. HAPC designation provides a means for the Council and NMFS to highlight areas within EFH as priorities for conservation and management. The HAPC alternatives in the EIS are a range of different methodological approaches, rather than different specific types or areas of habitat to be identified as HAPCs, so the effects of identifying HAPCs cannot be evaluated with specificity in this EIS. The Council decided to establish an approach to HAPC identification first (via this EIS), and then, subsequently, to identify specific HAPCs. Differences in the environmental consequences of the alternatives are, therefore, related to the type of approach that would be used to identify HAPCs and the anticipated effects of HAPCs subsequently identified under each approach.

Identifying HAPCs, like identifying EFH, would not, in and of itself, have any direct environmental or socioeconomic impacts, but could have indirect impacts. The choice of an approach for identifying HAPCs would provide a means for the Council and NMFS to highlight priority areas within EFH for conservation and management. This EIS discusses the anticipated effects of each alternative on habitat, target species, the economic and socioeconomic aspects of federally managed fisheries, other fisheries and fishery resources, protected species, ecosystems and biodiversity, and non-fishing activities. Using a qualitative analysis, the EIS characterizes effects on each issue as negative, neutral, positive, or unknown (Table ES-4) and provides a narrative explanation of the anticipated effects.

In summary, HAPC identification could have benefits for habitat, target species, and federally managed fisheries, as well as ancillary benefits for other fisheries and fishery resources, protected species, and ecosystems. Alternative 1 would rescind the existing HAPCs and provide for no new HAPCs, leading to a loss of potential benefits from identifying HAPCs and implementing any resulting protective measures. Alternative 1 may have benefits for non-fishing activities potentially affecting EFH, insofar as no particular areas within EFH would be highlighted for review during interagency EFH consultations for various development activities. Likewise, Alternative 1 may have short-term benefits for fisheries, insofar as no particular areas within EFH would be highlighted for potential fishing restrictions to protect habitat, although fisheries could lose potential long-term benefits of conservation of especially valuable habitats. Alternative 2 would retain the status quo HAPCs and associated effects. However, the broad and general nature of the existing HAPC designations may limit their efficacy. Alternatives 3 through 5 would rescind the existing HAPCs in favor of other approaches that would allow the Council to identify HAPCs in the future. The resulting indirect effects would depend upon the specific HAPCs implemented in future Council and NMFS actions. Alternatives 3 through 5 would have comparable potential effects on habitat, federally managed fisheries, other fisheries and fishery resources, protected species, ecosystems, and non-fishing activities. Alternative 3 (preliminary preferred alternative) would limit HAPCs to specific sites, rather than permitting HAPCs to be identified for general types of habitat wherever they may be found. Alternative 3 could, thus, be more effective than Alternative 2 by virtue of being more focused. Alternative 4 may offer more potential benefits for target species than the other alternatives because the stepwise process of selecting habitat types and then specific sites could yield a

more rational and structured effort to ensure that HAPCs would focus on the habitats within EFH that are most valuable and/or vulnerable. Alternative 5 would limit the identification of HAPCs to specific sites supporting habitat functions for individual target species. It therefore has the potential to benefit target species more directly than the other alternatives, although scarce scientific information about habitat requirements of individual species could limit the effectiveness of this approach. Table ES-4 summarizes the effects of the HAPC identification alternatives for each topic evaluated in the EIS. Table ES-5 compares the alternatives in terms of three summary factors: (1) the relative size of HAPCs identified, (2) consistency with the EFH regulations, and (3) overall efficacy and relative merits of the approach.

Action 3: Minimize Adverse Effects of Fishing on EFH

Alternatives

Alternative 1 (Status Quo / No Action – Preliminary Preferred Alternative): Under Alternative 1, no additional measures would be taken at this time to minimize the effects of fishing on EFH. No new actions were taken to minimize the effects of fishing as part of the original EFH FMP amendments in 1998, although the Council has adopted a number of measures that protect habitat from potential negative effects of fishing, both before and since that date, and those measures would remain in effect. For reference, existing year-round trawl closures are depicted in Figure ES-1.

Alternative 2 (Gulf Slope Bottom Trawl Closures): Alternative 2 would prohibit the use of bottom trawls for rockfish in designated areas of the GOA upper to intermediate slope (200 to 1,000 m), but would allow vessels endorsed for trawl gear to use fixed gear or pelagic trawl gear to fish for rockfish in these areas. See Figure ES-2.

Alternative 3 (Upper Slope Bottom Trawl Prohibition for GOA Slope Rockfish): Alternative 3 would prohibit the use of bottom trawls for targeting GOA slope rockfish species on the entire upper to intermediate slope area (200 to 1,000 m), but would allow vessels endorsed for trawl gear to use fixed gear or pelagic trawl gear to fish for slope rockfish. See Figure ES-3.

Alternative 4 (Bottom Trawl Closures in All Management Areas): Alternative 4 would prohibit the use of bottom trawls in designated areas of the eastern Bering Sea (EBS), Aleutian Islands (AI), and GOA, as well as requiring trawl gear modifications in the BS area.

> *Bering Sea*: Prohibit the use of bottom trawls for all groundfish fisheries except within a designated "open" area, based on historic bottom trawl effort. Within the open area, there would be rotating closures to bottom trawl gear in five areas to the west, north, and northwest of the Pribilof Islands (Figure ES-4). Each of the five areas would be divided into four blocks, and one block in each area would be closed for 10 years. After 10 years, the closed block would reopen, and a different block would close for 10 years, and so forth. In addition, bottom trawls used in the remaining open areas would be required to have sweeps and footropes equipped with disks/bobbins to reduce contact area and proximity to the seafloor.
>
> *Aleutian Islands*: Prohibit the use of bottom trawls for all groundfish fisheries in designated areas of the AI: Stalemate Bank, Bowers Ridge, Seguam Foraging Area, and Semisopochnoi Island (Figure ES-5).
>
> *Gulf of Alaska*: Prohibit the use of bottom trawls for rockfish fisheries in designated sites of the upper to intermediate slope (200 to 1,000 m; see Figure ES-6). Vessels endorsed for trawl gear would be allowed to fish for rockfish with fixed gear or pelagic trawl gear in these areas.

Alternative 5A (Expanded Bottom Trawl Closures in All Management Areas): Alternative 5A would prohibit the use of bottom trawls in larger designated areas of the EBS, AI, and GOA and would require trawl gear modifications in the EBS area.

Bering Sea: Prohibit the use of bottom trawls for all groundfish fisheries except within a designated "open" area, based on historic bottom trawl effort. Within the open area, there would be rotating closures to bottom trawls in five areas to the west, north, and northwest of the Pribilof Islands (Figure ES-7). Each of the five areas would be divided into three blocks, and one block in each area would be closed for 5 years. After 5 years, the closed block would reopen, and a different block would close for 5 years, and so forth. In addition, bottom trawls used in the remaining open areas would be required to have sweeps and footropes equipped with disks/bobbins to reduce contact area and proximity to the seafloor.

Aleutian Islands: Prohibit the use of bottom trawls for all groundfish fisheries in designated areas of the AI: Stalemate Bank, Bowers Ridge, Seguam Foraging Area, Yunaska Island, and Semisopochnoi Island. These closure areas would extend to the northern and southern boundaries of the AI management unit (Figure ES-8).

Gulf of Alaska: Prohibit the use of bottom trawls for all groundfish fisheries in designated sites of the upper to intermediate slope (200 to 1,000 m). Additionally, prohibit the use of bottom trawls for targeting GOA slope rockfish on the GOA upper to intermediate slope (200 to 1,000 m), but allow vessels endorsed for trawl gear to use fixed gear or pelagic trawl gear to fish for rockfish in these areas. See Figure ES-9.

Alternative 5B (Expanded Bottom Trawl Closures in All Management Areas with Sponge and Coral Area Closures in the AI): Alternative 5B would prohibit the use of bottom trawls in designated areas of the EBS, AI, and GOA and would require trawl gear modifications in the EBS area.

Bering Sea: Prohibit the use of bottom trawls for all groundfish fisheries except within a designated "open" area, based on historic bottom trawl effort. Within the open area, there would be rotating closures to bottom trawls in five areas to the west, north, and northwest of the Pribilof Islands (Figure ES-7). Each of the five areas would be divided into three blocks, and one block in each area would be closed for 5 years. After 5 years, the closed block would reopen, and a different block would close for 5 years, and so forth. In addition, bottom trawls used in the remaining open areas would be required to have sweeps and footropes equipped with disks/bobbins to reduce contact area and proximity to the seafloor.

Aleutian Islands: Allow bottom trawling to continue in AI areas that have supported the highest catches in the past, and prohibit bottom trawling in all other portions of the AI management region to prevent future impacts to undisturbed habitats in those areas, in accordance with one of the three options described below. Pelagic trawls could be used outside of the designated open areas, but only in the off-bottom mode. All of the options would include a requirement for 100 percent observer coverage and a vessel monitoring system for vessels fishing for groundfish. All of the options include the intent that a comprehensive plan for research and monitoring would be developed in the AI.

Option 1

1. Open areas would be designated based on areas of higher effort distribution from 1990 through 2001. Open and closed areas designated under this alternative are shown in Figure ES-10.

2. TAC reductions would be made for Pacific cod, Atka mackerel, and rockfish in proportion to the catch attributable to the closed areas.

3. Coral/bryozoan and sponge bycatch limits would be imposed to close specific fisheries and areas if a bycatch limit were reached.

Option 2

1. Open areas would be designated based on the methodology used in Option 1 above, with eight specific modifications based on data analysis and input from fishermen and Aleutian Islands residents, as recommended by Oceana. The specific modifications involve the following areas: Buldir Island, Murray Canyon, South Amchitka, Petrel Bank, Gusty Bay, Kanaga Island, Adak South, and Atka Pass. Open and closed areas designated under this alternative are shown in Figure ES-11.

2. TAC reductions would be made for Atka mackerel and rockfish in proportion to the catch attributable to the closed areas.

3. Coral/bryozoan and sponge bycatch limits would be imposed to close specific fisheries and areas if a bycatch limit were reached.

4. All bottom contact fishing would be prohibited in six coral garden sites located off Semisopochnoi Island, Bobrof Island, Cape Moffet, Great Sitkin Island, Ulak Island, and Adak Canyon, as shown in Figure ES-11.

Option 3

Open areas would be designated based on the methodology used in Option 1 above, with specific modifications based on data analysis and input from trawl fishermen, as recommended by the Groundfish Forum. Open and closed areas designated under this alternative are shown in Figure ES-12.

Gulf of Alaska: Prohibit the use of bottom trawls for all groundfish fisheries in designated sites of the upper to intermediate slope (200 to 1,000 m). Additionally, prohibit the use of bottom trawls for targeting GOA slope rockfish on the GOA upper to intermediate slope (200 to 1,000 m), but allow vessels endorsed for trawl gear to use fixed gear or pelagic trawl gear to fish for rockfish in these areas. See Figure ES-9.

Alternative 6 (Closures to All Bottom-tending Gear in 20 percent of Fishable Waters): Alternative 6 would prohibit the use of all bottom-tending gear (dredges, bottom trawls, and pelagic trawls that contact the bottom, longlines, dinglebars, and pots) for commercial fisheries within approximately 20 percent of the fishable waters (i.e., 20 percent of the waters shallower than 1,000 m) in the GOA, AI, and BS. See Figures ES-13, ES-14, and ES-15.

Environmental Consequences

The alternatives for minimizing the adverse effects of fishing on EFH are a range of specific management options. The alternatives all start with the status quo fishery management regime that includes a variety of measures that help to reduce the potential effects of fishing on habitat (e.g., area closures, gear restrictions, and limitations on fishing effort). Alternatives 2 through 6 would add progressively more restrictive management measures. The short-term economic and socioeconomic effects of the alternatives can be clearly described, at least in qualitative terms: fishery management measures impose costs that can be estimated in terms of revenue at risk or other empirical measures. The ecological effects of the alternatives are more difficult to assess because current scientific information does not provide a clear picture to link habitat conservation measures with specific quantifiable benefits to the growth, reproduction, and survival of managed fish species. Limited information is available to describe the effects on productivity of managed species from habitat alteration caused by fishing. Likewise, there are no proven techniques for quantifying the benefits to target species that may accrue as a result of adopting any of the alternatives to minimize the effects of fishing on EFH (although many studies worldwide have documented the results of implementing various closed areas). In summary, although short-term costs to the industry are relatively easy to identify, the long-term economic and socioeconomic benefits that may accrue from habitat conservation measures are harder to predict with much precision. Nevertheless, the EIS uses the best information available to summarize the effects of fishing on EFH and the consequences of the alternatives.

The EIS evaluates the effects of fishing on habitat by using a quantitative mathematical model developed for this analysis by the NMFS Alaska Fisheries Science Center. The model estimates the proportional reductions in habitat features relative to an unfished state, assuming that fishing will continue at the current intensity and distribution until the alterations to habitat and the recovery of disturbed habitat reach equilibrium. The model provides a tool for bringing together all available information on the effects of fishing on habitat, such as fishing gear types and sizes used in Alaska fisheries, fishing intensity information from observer data, and gear impacts and recovery rates for different habitat types. Due to the uncertainty regarding some input parameters (e.g., recovery rates of different habitat types), the results of the model are displayed as point estimates, as well as a range of potential effects.

After considering the available tools and methodologies for assessing effects of fishing on habitat, NMFS, the Council, and the Council's Scientific and Statistical Committee concluded that the model incorporates the best available scientific information and provides a good approach to understanding the impacts of fishing activities on habitat. The model was also reviewed and supported by an independent panel of outside experts. Nevertheless, the model and its application in this EIS have many limitations. Both the developing state of this new model and the limited quality of available data to estimate input parameters prevent drawing a complete picture of the effects of fishing on EFH. The model incorporates a number of assumptions about habitat effect rates, habitat recovery rates, habitat distribution, and habitat use by managed species. The quantitative outputs of the analysis may convey an impression of rigor and precision, but the results actually are subject to considerable uncertainty.

The analysis indicates that there are long-term effects of fishing, particularly bottom trawling, on benthic habitat features off Alaska. Considerable scientific uncertainty remains regarding the consequences of such habitat changes for the sustained productivity of managed species. If the current pattern of fishing intensity and distribution continues into the future, living habitat features that provide managed species with structure for refuge would be reduced by 0 to 11 percent in each habitat area, with the largest reduction occurring on soft substrates of the Aleutian slope area. Hard corals would be reduced by 0 to 16 percent, with the largest reduction occurring on hard substrates of the Aleutian shallow water area. There would be almost no reduction (0 to 3 percent) in infaunal and epifaunal prey for managed species.

Viewed another way, habitat loss due to fishing off Alaska is relatively small overall, with most of the available habitats unaffected by fishing (infaunal prey are 97 to 100 percent unaffected, epifaunal prey are 97 to 100 percent unaffected, living structure is 89 to 100 percent unaffected, and hard corals are 84 to 98 percent unaffected).

Based on the best available scientific information, the EIS analysis concludes that despite persistent disturbance to certain habitats, the effects on EFH are minimal because the analysis finds no indication that continued fishing activities at the current rate and intensity would alter the capacity of EFH to support healthy populations of managed species over the long term. The EIS concludes that no Council-managed fishing activities have more than minimal and temporary adverse effects on EFH for any FMP species, which is the regulatory standard requiring action to minimize adverse effects under the Magnuson-Stevens Act (50 CFR 600.815(a)(2)(ii)). Additionally, the analysis indicates that all fishing activities combined have minimal, but not necessarily temporary, effects on EFH. These findings suggest that no additional actions are required pursuant to the EFH regulations. However, as noted above, the analysis has many limitations, and the effects of fishing on EFH for some managed species are unknown. Even though the available information does not identify adverse effects of fishing that are more than minimal and temporary in nature, that finding does not necessarily mean that no such effects exist. Thus, appropriate precautionary measures may be warranted.

The EIS discusses the effects of each alternative on habitat, target species, the economic and socioeconomic aspects of federally managed fisheries, other fisheries and fishery resources, protected species, and ecosystems and biodiversity. Using a qualitative analysis, the EIS characterizes effects on each issue as negative, neutral, positive, or unknown (Table ES-6) and provides a narrative explanation of the anticipated effects (Table ES-7). Alternative 1 (preliminary preferred alternative) would add no new fishery management measures and would have no effects relative to the status quo. Alternative 2 would have no substantial effects on habitat, target species, communities, protected species, or ecosystems. It would have relatively limited costs (economic costs of the alternatives are discussed in more detail below) and would provide slight positive effects for GOA deep-water Tanner crabs and golden king crabs. Alternative 3 would have positive effects on epibenthic structures and coral on the GOA slope, impose higher economic costs, and cause marginal reductions in safety for the fishing fleet. Its effects are otherwise similar to those of Alternative 2. Alternative 4 would have positive effects on coral in the AI area, benefits for epibenthic structures in the EBS due to trawl gear modifications, and modest benefits for GOA slope rockfish habitats. Costs to the fishing industry would be more than twice as high as in Alternative 3, and there would be additional adverse consequences for safety. Alternative 5A would benefit coral substantially in the AI, have positive effects on epibenthic structures and coral in the GOA, and benefit epibenthic structures in the EBS due to trawl gear modifications. However, Alternative 5A would double industry costs again relative to Alternative 4, and would have additional consequences for safety and for western GOA communities. Alternative 5B would have the same effects as Alternative 5A in the GOA and the EBS. In the AI it would provide considerably more protection of coral and sponge habitats, although the specific habitats that would be closed to fishing vary amongst the three management options. Economic costs to the industry and monitoring and enforcement costs would be higher for Options 1 and 2, and costs for Option 3 would be comparable to Alternative 5A. Alternative 5B might have slight adverse effects for Steller sea lion foraging success in the AI. Alternative 6 would have moderately positive effects on epibenthic structures in all areas and would benefit coral habitats in the GOA and AI. Costs to the fishing industry and communities would be dramatically higher and would extend to state-managed fisheries if corresponding measures were adopted in state waters. Additionally, Alternative 6 might cause adverse effects on Steller sea lions in portions of the AI due to the displacement of fishing effort from other areas, possibly resulting in more sea lion interactions with vessels or gear, or the concentrated removal of sea lion prey.

This EIS also compares each of the alternatives for minimizing the effects of fishing on EFH to a pre-status quo scenario to provide additional context. Over the years, the Council has implemented numerous measures to protect habitat. The pre-status quo scenario reflects conditions (environment, stock size, etc.) absent all area closures, effort reduction, gear measures, and rationalization programs. By comparing each of the alternatives to the pre-status quo scenario, the comparative summary illustrates that all seven of the alternatives start with a common suite of management measures that already provide a substantial degree of habitat protection. The status quo alternative (Alternative 1) includes only those existing management measures, whereas all of the other alternatives include the existing management measures plus additional measures.

Practicability Analysis

To assist in determining whether additional management measures are practicable, the EIS considers the long- and short-term costs and benefits of the potential management measures to EFH, associated fisheries, and the nation. A summary of the relative habitat conservation benefits and costs associated with each alternative appears in Table ES-8. Given the apparent limited adverse effects on EFH, and the costs and benefits of the alternatives, most alternatives would be practicable to implement, with the exception of Alternative 6, which would have substantially greater adverse effects on fishermen, communities, and associated industries than attributable benefits.

Relative to Alternative 1 (status quo), Alternatives 2 and 3 would provide very little habitat conservation benefit because the closure areas would reduce the effects of fishing only slightly, and only on the GOA slope area. Alternative 4 would provide some degree of additional habitat conservation for all three regions (EBS, AI, and GOA) through the use of specific bottom-trawl closures, as well as bottom-trawl gear modifications for vessels fishing in the EBS. Alternative 5A would increase the amount of protection further by expanding the size of the bottom trawl closures in the EBS and AI and closing areas of the GOA slope to all bottom trawling. Alternative 5B would further minimize the effects of fishing by closing additional areas in the AI (including areas with high incidental catch rates of corals and sponges), and under Options 1 and 2, reducing catch and setting bycatch limits for bryozoans/corals and sponges. Alternative 6 would reduce the effects of fishing because approximately 20 percent of the available habitats would be left virtually undisturbed by fishing and would be allowed to recover to an unfished state. However, a large amount of fishing effort could be redistributed from areas of effort concentration to previously unfished or lightly fished areas, negating some potential benefits of this alternative.

There are also economic and socioeconomic costs associated with the alternatives to minimize the effects of fishing on habitat. Alternative 2 would have relatively minimal costs (gross revenue at risk $0.9 million). Alternatives 3, 4, and 5A would involve moderate costs to the fishing fleets (gross revenue at risk $2.7 million to $7.9 million). Alternative 5B would involve higher costs to the fleet (gross revenue at risk of $7.5 million to $28.1 million depending on which AI management option is selected), as well as negative effects on shoreside support industries and western GOA communities. Alternative 6 would have very high relative costs to the fleet (gross revenue at risk of $237 million) and negative effects on shoreside support industries and coastal fishing communities.

From a practical standpoint, the alternatives differ in the habitat areas closed and the resulting amount of habitat conservation, as well as the economic and socioeconomic effects. Some areas considered for bottom trawl closures would provide habitat conservation benefits at almost no additional cost. For example, the closure area on the lower slope and basin would restrict future fisheries but would not have direct economic costs to the current fishing industry. Likewise, limiting fishing to areas where it has occurred historically, and closing areas that are relatively undisturbed, as in the EBS and AI portions of

Alternative 5B, would protect habitats from potential future disturbance without incurring significant short-term costs.